

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application: Claims 1-39 have been cancelled. Claims 40-65 are pending.

Listing of Claims:

1. (Cancelled) A method of growing a CdS/ZnS graded shell, comprising:
providing a core,
combining the core with at least one surfactant,
heating the mixture,
combining the mixture with a CdS/ZnS stock solution,
wherein the core comprises a semiconductor material, and
graded core/shell nanorods are produced.
2. (Cancelled) The method of claim 1, wherein:
the core is rod shaped.
3. (Cancelled) The method of claim 2, wherein:
the core comprises CdSe.
4. (Cancelled) The method of growing a CdS/ZnS graded shell of claim 1, wherein:
the mixture is heated to a temperature between 100-360 °C.
5. (Cancelled) The method of growing a CdS/ZnS graded shell of claim 1, wherein:
the mixture is heated to a temperature of 160°C.
6. (Cancelled) The method of growing a CdS/ZnS graded shell of claim 1, wherein:
the core is combined with only one surfactant.
7. (Cancelled) The method of growing a CdS/ZnS graded shell of claim 1, wherein:
the surfactant is chosen from the group consisting of TOPO, TBP, HDA, HPA and TDPA.
8. (Cancelled) The method of growing a CdS/ZnS graded shell of claim 1, wherein:

the mixture is kept at a temperature of approximately 160° for between 5 minutes and 24 hours after combining the CdS/ZnS stock solution.

9. (Cancelled) The method of growing a CdS/ZnS graded shell of claim 8, wherein:
the mixture is kept at a temperature of 160°C for 10 minutes after combining the CdS/ZnS stock solution.
10. (Cancelled) The method of growing a CdS/ZnS graded shell of claim 1, wherein:
the core is a shaped nanorod.
11. (Cancelled) The method of growing a CdS/ZnS graded shell of claim 10, wherein:
the core has a tetrapod shape.
12. (Cancelled) The method of growing a CdS/ZnS graded shell of claim 1, wherein:
the graded core/shell nanorods are photochemically annealed.
13. (Cancelled) The method of growing a CdS/ZnS graded shell of claim 12, wherein:
the annealing is done using an Ar⁺ laser.
14. (Cancelled) A method of growing a CdS/ZnS graded shell, comprising:
providing a core/surfactant mixture,
heating the mixture,
combining the mixture with a CdS/ZnS stock solution.
15. (Cancelled) The method of growing a CdS/ZnS graded shell of claim 14, wherein:
the core is rod shaped.
16. (Cancelled) The method of growing a CdS/ZnS graded shell of claim 15, wherein:
the core comprises CdSe.
17. (Cancelled) The method of growing a CdS/ZnS graded shell of claim 14, wherein:
the mixture is heated to a temperature between 100-360 °C.
18. (Cancelled) The method of growing a CdS/ZnS graded shell of claim 14, wherein:

the mixture is heated to a temperature of 160°C.

19. (Cancelled) The method of growing a CdS/ZnS graded shell of claim 14, wherein:
the core/surfactant mixture contains only one surfactant.
20. (Cancelled) The method of growing a CdS/ZnS graded shell of claim 14, wherein:
the surfactant is chosen from the group consisting of TOPO, TBP, HDA, HPA and TDPA.
21. (Cancelled) The method of growing a CdS/ZnS graded shell of claim 14, wherein:
the mixture is kept at a temperature of approximately 160° for between 5 minutes and 24 hours after combining the CdS/ZnS stock solution.
22. (Cancelled) The method of growing a CdS/ZnS graded shell of claim 21, wherein:
the mixture is kept at a temperature of 160°C for 10 minutes after combining the CdS/ZnS stock solution.
23. (Cancelled) The method of growing a CdS/ZnS graded shell of claim 14, wherein:
the core is a shaped nanorod.
24. (Cancelled) The method of growing a CdS/ZnS graded shell of claim 23, wherein:
the core has a tetrapod shape.
25. (Cancelled) A method of growing a graded core/shell semiconductor nanorod, comprising:
providing a semiconductor nanorod core,
combining the core with at least one surfactant,
heating the surfactant/core mixture,
combining the mixture with a solution,
wherein said solution comprises semiconductor precursors in molar ratio sufficient to cause the growth of a graded semiconductor shell on the core.

26. (Cancelled) The method of growing a graded core/shell semiconductor nanorod of claim 25, wherein:
the semiconductor nanorod core comprises a semiconductor material selected from the group consisting of Group II-VI, Group III-V and Group IV semiconductors.
27. (Cancelled) The method of growing a graded core/shell semiconductor nanorod of claim 25, wherein:
the core is rod shaped.
28. (Cancelled) The method of growing a graded core/shell semiconductor nanorod of claim 25, wherein:
the core comprises CdSe.
29. (Cancelled) The method of growing a graded core/shell semiconductor nanorod of claim 25, wherein:
the mixture is heated to a temperature between 100-360 °C.
30. (Cancelled) The method of growing a graded core/shell semiconductor nanorod of claim 29, wherein:
the mixture is heated to a temperature of 160°C.
31. (Cancelled) The method of growing a graded core/shell semiconductor nanorod of claim 25, wherein:
only one surfactant is combined with the core.
32. (Cancelled) The method of growing a graded core/shell semiconductor nanorod of claim 25, wherein:
the surfactant is chosen from the group consisting of TOPO, TBP, HDA, HPA and TDPA.

33. (Cancelled) The method of growing a graded core/shell semiconductor nanorod of claim 25, wherein:
the mixture is kept at a temperature of approximately 160° for between 5 minutes and 24 hours after combining the solution.
34. (Cancelled) The method of growing a graded core/shell semiconductor nanorod of claim 33, wherein:
the mixture is kept at a temperature of 160°C for 10 minutes after combining the solution.
35. (Cancelled) The method of growing a graded core/shell semiconductor nanorod 25, wherein:
the core is a shaped nanorod.
36. (Cancelled) The method of growing a graded core/shell semiconductor nanorod of claim 35, wherein:
the core has a tetrapod shape.
37. (Cancelled) The method of growing a graded core/shell semiconductor nanorod of claim 25, wherein:
the graded core/shell nanorod is photochemically annealed.
38. (Cancelled) The method of growing a graded core/shell semiconductor nanorod of claim 37, wherein:
the annealing is done using an Ar⁺ laser.
39. (Cancelled) The method of growing a graded core/shell semiconductor nanorod of claim 25, wherein:
the core comprises CdSe and the graded shell comprises CdS/ZnS.

40. (Original) A graded core/shell semiconductor nanorod comprising:
- at least a first segment comprising:
 - a core comprising a Group II-VI, Group III-V or a Group IV semiconductor,
 - a graded shell overlying the core,
 - wherein the graded shell comprises at least two monolayers,
 - wherein the at least two monolayers each independently comprise a Group II-VI, Group III-V or a Group IV semiconductor.
41. (Original) The graded core/shell semiconductor nanorod of claim 40, wherein:
- the graded shell has at least three monolayers, and
 - the monolayer closest to the core comprises a first semiconductor material, and
 - the outermost monolayer comprises a second semiconductor material, wherein
 - between the monolayer closest to the core and the outermost monolayer there exists a concentration gradient of the first and second semiconductor material.
42. (Original) The graded core/shell semiconductor nanorod of claim 40, wherein:
- the number of monolayers is between two and eight.
43. (Original) The graded core/shell semiconductor nanorod of claim 42, wherein:
- the number of monolayer is between 2 and 6.
44. (Original) The graded core/shell semiconductor nanorod of claim 40, wherein:
- there is a tail extending longitudinally from the core.
45. (Original) The graded core/shell semiconductor nanorod of claim 40, wherein:
- the core comprises CdSe and the graded core/shell comprises CdS/ZnS.
46. (Original) The graded core/shell semiconductor nanorod of claim 40, wherein:
- there is joined to the first segment a second segment comprising:
 - a core comprising a Group II-VI, Group III-V or a Group IV semiconductor,

a graded shell overlying the core,
wherein the graded shell comprises at least two monolayers,
wherein the at least two monolayers each independently comprise a Group II-VI, Group III-V or a Group IV semiconductor.

47. (Original) The graded core/shell semiconductor nanorod of claim 46, wherein:
the second segment core comprises CdSe and the second segment graded shell monolayers comprise, in order, CdS/ZnS.
48. (Original) The graded core/shell semiconductor nanorod of claim 47, wherein:
the first and the second segments have different cross sectional areas.
49. (Original) The graded core/shell semiconductor nanorod of claim 47, wherein:
there is a third segment joined to the second segment.
50. (Original) The graded core/shell semiconductor nanorod of claim 49, wherein:
the first, second and third segments have different cross sectional areas.
51. (Currently Amended) A nanorod barcode, comprising:
a first segment of a first material; and
a second segment of a second material joined longitudinally to said first segment;
wherein at least one of the first and second segments is ~~capable of~~ configured to generate
~~generating~~ emission in response to excitation energy.
52. (Original) The nanorod barcode of claim 51, wherein:
said first and second segments comprise a nanorod core, and
said first and second segment cores independently comprise either a semiconductor material selected from the group consisting of Group II-VI, Group III-V and Group IV semiconductors or a metal selected from the group consisting of transition metals, oxides and nitrides thereof.

53. (Original) The nanorod barcode of claim 52, wherein:

said first and second segment cores independently comprise a semiconductor material selected from the group consisting of Group II-VI, Group III-V and Group IV semiconductors.

54. (Original) The nanorod barcode of claim 52, wherein:

said first segment core comprises a metal selected from the group consisting of transition metals, oxides and nitrides thereof, and
said second segment comprises a semiconductor material selected from the group consisting of Group II-VI, Group III-V and Group IV semiconductors.

55. (Original) The nanorod barcode of claim 52, further comprising:

a third segment connected longitudinally to said first segment core, and
said third segment core comprising a semiconductor material selected from the group consisting of Group II-VI, Group III-V and Group IV semiconductors.

56. (Original) The nanorod barcode of claim 55, wherein:

said second and third segments have different cross sectional areas.

57. (Original) The nanorod barcode of claim 55, wherein:

said first segment core comprises Co, and said second and third segment cores comprise CdSe.

58. (Original) The nanorod barcode of claim 53, wherein:

said first and second segments have different cross sectional areas.

59. (Original) The nanorod barcode of claim 58, wherein:

at least one of said first and second segment cores have a graded shell overlying the core.

60. (Original) The nanorod barcode of claim 58, wherein:

both segment cores have a graded shell overlying said cores.

61. (Original) The nanorod barcode of claim 53, wherein:

there is a third segment joined longitudinally to said second segment, and
said third segment comprises a semiconductor material selected from the group
consisting of Group II-VI, Group III-V and Group IV semiconductors.

62. (Original) The nanorod barcode of claim 61, wherein:

at least one of said first and second and third segment cores have a graded shell overlying
the core.

63. (Original) The nanorod barcode of claim 62, wherein:

all segment cores have a graded shell overlying the cores.

64. (Original) The nanorod barcode of claim 55, wherein:

said first, second and third segments have different cross sectional areas.

65. (Original) A method of using a nanorod barcode to identify an element, comprising:

labeling at least one identifiable element with at least one nanorod barcode as claimed in
claim 51.